MECHANICAL SYSTEMS DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-PWD-VSL-00044

R10660652

Project	***RPP-WTP***	P&ID	***24590-PTF-M6-PWD-P0002/P0046 24590-PTF-M6-UFP-P0007/8/9/11***
Project No	***24590***	Calculations:	***24590-PTF-MVC-PWD-00028 / 24590-PTF-MVC-PWD-00020*** △3
Project Site	***Hanford***	Vessel Drawing	***24590-PTF-MV-PWD-P0010***
Description	***Plant Wash Vessel***		ISSUED BY RPP-WTP PDC

Reference Data

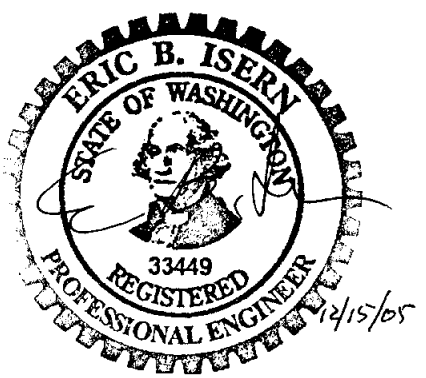
Charge Vessels (Tag Numbers)	***PWD-VSL-00121, PWD-VSL-00122, PWD-VSL-00123, PWD-VSL-00124, PWD-VSL-00125***
Pulsejet Mixers / Agitators (Tag Numbers)	***PWD-PJM-00021, PWD-PJM-00022, PWD-PJM-00023, PWD-PJM-00024, PWD-PJM-00025, PWD-PJM-00026, PWD-PJM-00027, PWD-PJM-00028***
RFDs/Pumps (Tag Numbers)	***PWD-RFD-00121, PWD-RFD-00122, PWD-RFD-00123, PWD-RFD-00124, PWD-RFD-00125***

Design Data

Quality Level		***QL-1***	Fabrication Specs	***24590-WTP-3PS-MV00-TP001***		
Seismic Category		***SC-I***	Design Code	***ASME Section VIII, Div. 1***		
Service/Contents		***Radioactive Liquid***	Code Stamp	***YES***		
Design Specific Gravity		***1.27***	NB Registration	***YES***		
Operating Volume	gal	***88,631***	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	***103,024***	Estimated	***227,000***	***1,156,000***	***1,088,000***
Environmental Qualifications		***N/A***	Actual ** △3	***204,600***	***1,127,100***	***1,064,900***

Inside Diameter	inch	***276***			Wind Design	***Not Required***	
Length/Height (TL-TL)	inch	***306***			Snow Design	***Not Required***	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	***24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS90-T0001***	
Internal Pressure	psig	***0.00***	***15***	***N/A***	Seismic Base Moment *	ft*lb	
External Pressure	psig	***0.22***	***8.0***	***N/A***	Postweld Heat Treat	***Not Required***	
Temperature	°F	***212***	***237***	***N/A***	Corrosion Allowance	Inch	***0.08 (Notes 9, 10)***
Min. Design Metal Temp.	°F	***40***			Hydrostatic Test Pressure *	Psig	

Note: Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.



EXPIRES: 07/28/07

This Bound Document Contains a total of 5 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
3	12/27/05	Issued for Permitting Use	C. Thompson	H. Khurana/L. Han	C. Slater	J. Sulyk
2	4/7/05	Issued for Permitting Use	C. Thompson	H. Khurana	C. Slater	M. Hoffmann
1	3/19/04	Issued for Permitting Use	J. Jackson	H. Khurana	C. Slater	M. Hoffmann
0	10/29/02	Issued for Permitting Use	J. Jackson	C. Slater	N/A	S. Kirk

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Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	SA 240 316 Note 1	See Drawing	Auxiliary (See note 6)
Shell	SA 240 316 Note 1	See Drawing	Primary (See note 6)
Bottom Head	SA 240 316 Note 1	See Drawing	Primary (See note 6)
Support	SA 240 304 Note 1	See Drawing	N/A
Jacket/Coils/Half-Pipe Jacket	N/A	N/A	N/A
Internals	SA240 316 Note 1	See Drawing	Thermowell Primary
Pipe	SA312 TP316 Note 1	See Drawing	Primary (See note 6)
Forgings/ Bar stock	SA182 F316 Note 1	See Drawing	N/A
Gaskets	N/A	N/A	N/A
Bolting	N/A	N/A	N/A

Miscellaneous Data

Orientation	Vertical	Support Type	Skirt
Insulation Function	Not Applicable	Insulation Material	Not Applicable
Insulation Thickness (inch)	Not Applicable	Internal Finish	Note 3
		External Finish	Note 3

Remarks

* To be determined by the vendor.

**The actual weights shown herein are based on the original seismic data and these figures are subject to change, based on the new loads, obtained from the seismic redesign. △3

Note 1: Max. carbon of 0.030 %

Note 2: Deleted

Note 3: Welds descaled as laid.

Note 4: Vessel volumes are approximate and do not account for the manufacturing tolerances, nozzles, and displacement of internals.

Note 5: This vessel is in a Black cell.

Note 6: All welds forming part of the primary and auxiliary containment including nozzle attachment welds shall be subjected to 100% volumetric examination.

Note 7: Contents of this document are Dangerous Waste Permit affecting.

Note 8: Deleted per report NO. 24590-WTP-RPT-M-04-00007 dated Nov. 01, 2004 △3

Note 9: BNI shall ensure that an additional 0.067" is available for erosion in the bottom head and shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances.

Note 10: BNI shall ensure that an additional 0.043" is available for erosion in the lower 4" of the interior conical surface of the pulse jet mixers.

Note 11: BNI shall include in its Dynamic Analysis, all hydrodynamic and overblow loads as per page 3 of this data sheet. △3

Note12: Revision 3 of this data sheet incorporates CCN 129149 and 128549. These CCN's added the words " in the form of overblow pressures" to the note shown above the overblow graph and further revised the note below the graph as noted herein on sheet 3. △3

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-PWD-VSL-00044***

Equipment Cyclic Data Sheet

Component	***24590-PTF-MV-PWD-VSL-00044***
Component Description	***Parent Vessel***

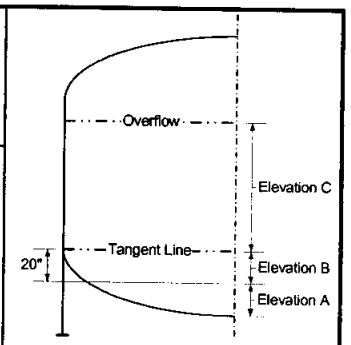
The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SA 240 316 with max. Carbon of 0.030 %***
Design Life	***40 years***
Component Function and Life Cycle Description	***This is a "batch" vessel and cycle from nearly empty to nearly full. This vessel will be in the fill mode for one day, then in the discharge mode over the next day.***

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***-8.0***	***15***	***10***	***Nominal assumption***
Operating Pressure	psig	***-0.22***	***0.00***	***7,300***	
Operating Temperature	°F	***59***	***212***	***7,300***	***Uniform material temperature range, not between two points***
Contents Specific Gravity		***1.00***	***1.27***	***N/A***	
Contents Level	inch	***Empty***	***Flooded***	***7,300***	***Coincident with pressure cycles***
Localized Features					
Nozzles		***Within 50°F of vessel operating range***		***As above***	

Hydrodynamic Loading

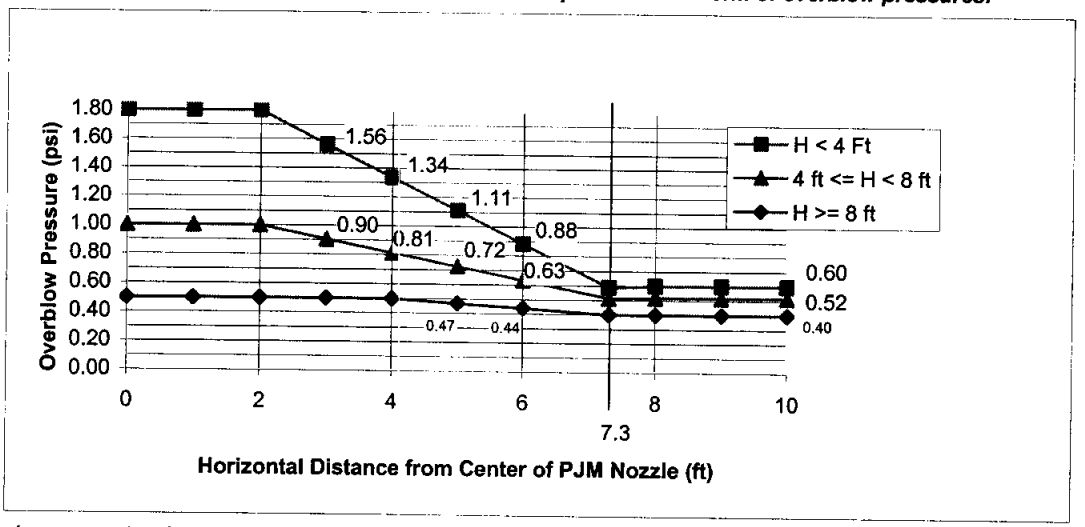
In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.



The following table indicates the normal hydrodynamic pressure at ranges of elevations in the vessel and the number of design cycles for each condition. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Normal Operation Hydrodynamic Pressure Range, psi						Number of Cycles
Elevation A		Elevation B		Elevation C		
Radial	Vertical	Radial	Vertical	Radial	Vertical	
-0.15 to 0.25	***-0.15 to 0.15***	***-0.05 to 0.12***	***-0.15 to 0.15***	***-0.03 to 0.10***	***-0.06 to 0.15***	***17.3×10^5***

Overblow loads vary as a function of the horizontal distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted in the form of overblow pressures: 3



For all vessel internal components other than the overblowing pulse jet mixer, the overblow forces shall be applied a) in the vertical upward direction, and b) in the horizontal direction radiating from the centerline of the overblowing pulse jet mixer. For the overblowing pulse jet mixer, the force shall be applied in the vertical upward direction only. The overblow force on all components, including structures and supports, shall be calculated by applying the overblow pressure at the location of the nearest surface of the component and to the projected area of the component, facing the appropriate direction. The normal force component, specified for the normal pulse jet mixer operation condition, is not applicable to the overblow condition. Any single pulse jet mixer may overblow 1000 cycles. Reference CCN 125541 dated 07/27/05. 3

Notes

- ***Cycle increase: Increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

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Equipment Cyclic Data Sheet

Component	*PWD-VSL-00121, PWD-VSL-00122, PWD-VSL-00123, PWD-VSL-00124, PWD-VSL-00125*
Component Description	*Charge Vessels*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*SA 240 316 with max. Carbon of 0.030 %*
Design Life	*40 years*
Component Function and Life Cycle Description	*These charge vessels are cyclically loaded using vacuum to fully fill the charge vessel with process liquid and compressed air to fully empty the charge vessel. The charge vessels are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The charge vessel supports shall be designed to cycle between fully buoyant (charge vessel empty and parent vessel full) and fully loaded (charge vessel full and parent vessel empty).*

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*55*	*10*	*Nominal assumption*
Operating Pressure	psig	*FV*	*30*	*1.8×10^6*	
Operating Temperature	°F	*59*	*212*	*7,300*	*Pressure cycles to be at 212° F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.*
Contents Specific Gravity		*1.00*	*1.27*	*N/A*	
Contents Level	inch	*Empty*	*Flooded*	*1.8×10^6*	*Coincident with pressure cycles*
Localized Features					
Supports		*As above*		*As above with contents level changing coincident with pressure cycles.*	

Notes

Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.

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Equipment Cyclic Data Sheet

Plant Item Number	*PWD-PJM-00021, PWD-PJM-00022, PWD-PJM-00023, PWD-PJM-00024, PWD-PJM-00025, PWD-PJM-00026, PWD-PJM-00027, PWD-PJM-00028*
Component Description	*Pulse Jet Mixers*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*SA 240 316 with max. Carbon of 0.030 %*
Design Life	*40 years*
Component Function and Life Cycle Description	*These pulse jet mixers (PJMs) are cyclically loaded using vacuum to fully fill the PJM with process liquid and compressed air to fully empty the PJM. The PJMs are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The PJM supports shall be designed to cycle between fully buoyant (PJM empty and parent vessel full) and fully loaded (PJM full and parent vessel empty) states. Thrust load shall be applied only to the fully buoyant state. Assume the parent vessel is full for 50% of the number of PJM cycles.*

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*85*	*10*	*Nominal assumption*
Operating Pressure	psig	*FV*	*60*	*1.73×10^7*	
Operating Temperature	°F	*59*	*212*	*1.73×10^7*	*Pressure cycles to be at 212° F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.*
Contents Specific Gravity		*1.00*	*1.27*	*N/A*	
Contents Level	inch	*Empty*	*Flooded*	*1.73×10^7*	*Coincident with pressure cycles*
Thrust	lbf	*0*	*264*	*1.73×10^7*	
Localized Features					
Supports		*As above*		*As above with contents level changing coincident with pressure cycles.*	

Notes

- *Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.*